Space Weather Forecast

From the 24th of September, the way we distribute this forecast is changing and you will need to take action to continue receiving it. You should have received an email on the 4th of September explaining the steps required to do this. If you have already signed up to receive the forecast on our premium website, please disregard this message. If you haven't, or if you need help with the process, please contact moswoc@metoffice.gov.uk.

Issued on Monday, 09 September 2024 at 13:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class flares remain likely throughout. A glancing coronal mass ejection could give a chance of G1-G2 Minor-Moderate Storms on Day 2 or 3 (10-11 Sep). Chance of minor solar radiation storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity is Moderate with a peak Moderate-class flare from near a sunspot region in the southwest. There are twelve sunspot regions on the disc. A broad complex of small spots sits in the south centre disc, with imagery hinting at some connection between these, along with a line of filament that continues back to another spot region further west. A region in the northeast still shows some magnetic complexity in its trailing portion, although some of its peripheral spots have been decaying. A new region in the northwest has seen smaller spots consolidating into two larger spots. The two spots in the southwest, one has now rotated off the disc, with the remaining spot also due to rotate off soon. The remaining spot regions are generally small and stable.

A full halo Coronal Mass Ejection (CME) was observed at 09/0500 UTC off the far-side of the Sun, which is likely associated with an eruption seen just beyond the east limb. This is yet to be analysed, although unlikely to have any Earth-directed component.

No Earth-directed coronal mass ejections (CMEs) have been observed during the period.

Solar Wind / Geomagnetic Activity: Slow wind conditions persisted with observed solar wind speeds generally at slow-ambient levels, currently around 350km/s. Interplanetary Magnetic Field was Weak to Moderate with the north-south component variable in direction and also mainly Weak. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) continued to slowly ease following the recent enhancements since 01 Sep. This remained well below the S1/Minor Radiation Storm level though.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is likely through the period with a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A possible high speed stream from a coronal hole in the

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northwest may see an increase in solar winds early on Day 1 (09 Sep), but this is currently late and so is low confidence. CME influences from a large filament eruption on 08 Sep are likely to give a glancing blow at Earth late on Day 2 (10 Sep) or early Day 3 (11 Sep).

Overall, generally Quiet (Kp1-2) geomagnetic activity is expected at first, with any fast wind arrival possibly seeing Active (Kp4) intervals and a slight chance of G1/Minor Storm (Kp5) levels. Late on Day 2 (10 Sep), or early on Day 3 (11 Sep), a glancing blow from the filament eruption CME is likely, with a chance of G1-G2/Minor-Moderate Storm levels (Kp5-6) being reached. The effects of this CME may linger on into Day 4 (12 Sep), but likely at a reduced level.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently above normal background levels, but well below the S1/Minor radiation storm threshold, and is forecast to continue easing towards background. There is a slight chance of any notable solar flares resulting in further enhancements.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	30	40	10
Strong	G3	No	1	5	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	99	30	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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